

# ORCHIDS

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**Dr. Robert E. Atkinson**





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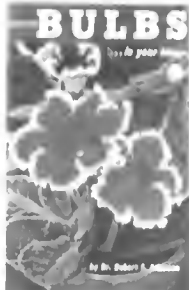
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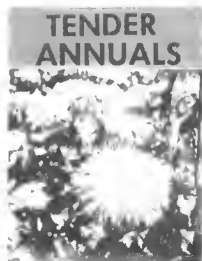


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by Dr. Robert E. Atkinson



Cattleyas in bloom are unexcelled by any other plant for interior decor.

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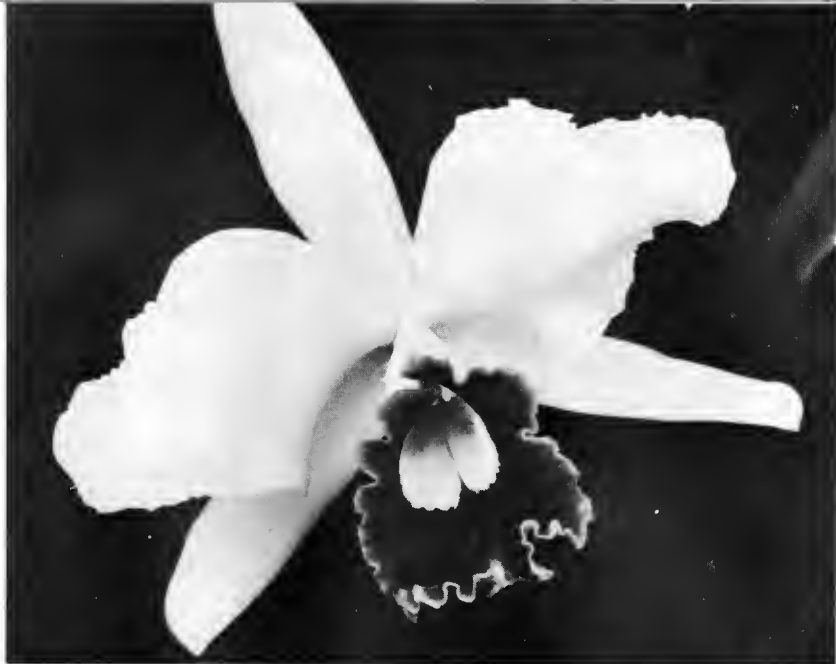
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A collection of 12 different Orchid plants will give you flowers every month of the year!





Bicolor Cattleya: Albula.

## INTRODUCTION

Many people have the mistaken belief that Orchids are rare and delicate flowers which can only be grown successfully, outside of their native habitat, in commercial hothouses. While it is true that Orchids cannot be grown *anywhere* and under *any conditions*, several Orchid varieties can be raised successfully under growth conditions no more difficult to maintain than for many common houseplants.

This book discusses basic information necessary for the beginning Orchid enthusiast. Included are Orchid classifications, methods of propagation, general culture and care, uses as indoor and outdoor plants, and specific information as to home growing some of the more popular Orchid varieties.

Several easy-reference charts give information as to blooming times, size of—and predominating colors of—flowers, and temperature classifications of many commonly-grown Orchid species.

Truly, Orchid growing can be made comparatively simple through proper choice of your plants and by following the directions set forth on the following pages.



Purple Cattleya: Tethys.

# 1

## WHAT IS AN ORCHID?

The average person thinks of an Orchid as a seemingly fragile, exotic, lavender flower originally found inhabiting the dark recesses of steaming jungles. These glamorous varieties, used in corsages for the most special occasions, are actually members of a far-flung family of plants which grow anywhere from the frozen tundra of Alaska to the chilly, wind-swept meadows of Patagonia (the farthest tip of South America) and to the hottest deserts of Africa. Orchids are grown in soil, on other plants (e.g., trees) and even in lakes and streams as aquatic plants. Although it is true that many more species are found in the torrid zones. Florida has 90 kinds of native Orchids, and the Minnesota State flower, the Moccasin (or Ladies' Slipper), is the *Cypripedium reginae* Orchid.

Contrary to common belief, Hawaii has almost no native Orchids—only 3 inconspicuous species have been found there. However, the keen plantsmen of Hawaii, mostly immigrants, have scoured the

world and returned with plants of great beauty as well as economic value. Thousands of species from distant lands have been hybridized, creating scores of more vigorous, superior types with larger flowers and new colors. As a result, shipping these new hybrids to all parts of the world has become a great industry.

The common characteristic of Orchids is a flower consisting of 3 sepals (small outside petals) and 3 petals, 1 of which is modified to form a lip. The stamen (pollen-bearing or male organ) and pistil (seed-bearing or female organ) are found in 1 column. All Orchids have a single stamen, except 4 genera which have 2.

**Vanda**







Miniature Cattleya.

## CLASSIFICATION OF ORCHIDS

If you are like most people, your interest in Orchids will first arise when you receive an Orchid plant as a gift. Then you will become aware of the enormous number of groups, sub-groups and species of Orchids — actually there are over 500 distinct groups of Orchids and over 1,500 species — many of which have been crossed, or genetically intermingled by a number of complex crosses, to produce many hundreds of thousands of varieties.

Generally speaking, Orchids are classified as *epiphytes* and *terrestrial*, or divided into groups on the basis of temperature requirements. *Epiphytes* (air plants) grow only on other plants, while *terrestrials* grow in the soil. When you find, however, that there are *semi-epiphytic* and *semi-terrestrial* forms, this classification seems to lose its simplicity.

*Epiphytes* (e.g., the Vanda Orchids) have coarse aerial roots that absorb moisture and minerals from the air. The roots which grow in the potting mix serve only to anchor the plant and hold it in position. Most of the Orchids grown in greenhouses (e.g., Cattleyas, Epidendrons, Miltonias, Odontoglossums and Oncidiums) belong to the *semi-epiphytic type*. Although they have active aerial roots, the roots imbedded in the planter mix are also functional in absorbing moisture and nutrients.



*Terrestrial* Orchids are a rare group (not commercially grown) which have fine, fibrous roots just like other plants. *Semi-terrestrial* Orchids (e.g., *Cymbidiums* and *Cypripediums*) lack aerial roots, but have somewhat fleshy roots that grow best in porous soil.

Grouping Orchids on the basis of temperature requirements is probably the most practical means, however. "Cool" types should be 5° cooler and "warm" kinds 5° warmer on the average, although occasional deviations will have no effect, since Orchids are exposed to varying temperatures in nature. *Vanda* and *Phalaenopsis* are 2

*Cypripedium* "Bagshot".





Miniature Cymbidium "Bo Peep" is only 1 foot tall.

that need warm temperatures, while *Odontoglossums*, some *Oncidiums*, *Cymbidiums* and plain-leaved *Cypripediums* are in the group that likes cool temperatures. Most Orchids, such as the *Cattleyas*, *Epidendrons*, *Dendrobiums* and most *Oncidiums* grow best at intermediate temperatures of about 60° at night and about 75° during the day.

It is also possible to classify Orchids on the basis of their growth, although this is not commonly done. Those that grow only in a single direction are called *monopodial*, whereas those that grow by lateral branches are called *sympodial*. The *sympodial* Orchids have true rhizomes (horizontal stems), producing roots which are either coarse or fine, depending on the nature of the habitat (place of growth). In addition to roots, some Orchids, notably the *Cattleyas*, have fleshy spindle-shaped storage structures called *psuedobulbs*.

Some of the more popular groups of Orchids and their growing requirements are discussed in this book. Several easy-reference tables also give blooming times, size of flowers and predominating colors of many of the commonly-grown species.

## 2

### PROPAGATION OF ORCHIDS

#### SEED

Not many years ago, growing Orchids was considered a rich man's hobby. Not only had the only available Orchids been gathered at terrific expense from their native habitat, but few offsets or plant-lets could be obtained from them. Thus they were sold for fabulous prices.

In 1922, however, Dr. Lewis Knutson of Cornell University developed a method of germinating Orchid seed in sterile culture. Even though it requires 3 to 8 years to grow a plant from seedling to bloom, this new germination method increased the number of fine hybrids, enabling Orchid breeding to proceed at a very rapid pace. This naturally caused Orchid prices to come tumbling down and brought Orchids within the financial reach of the average person.

Raising Orchids from seed need be of no concern to the plant hobbyist, since he can purchase plants near the flowering stage that will bloom immediately. Moreover, the price is no more than he will pay for ordinary shrubs and trees purchased from the nurseryman. However, many amateur Orchidists turn to hybridizing for additional interest after acquiring some experience, and some Orchid growers will want to buy small seedlings for reasons of economy. To many amateurs, the thrill of the first bloom from their own seedlings will be a joy beyond description.

#### GERMINATING ORCHID SEED

Orchid seed is germinated in a sterilized 500 cc Erlenmeyer flask containing 10 cc of a nutrient solution in agar. The nutrient solution contains the following chemicals:

Calcium nitrate	1.0	gram
Monobasic potassium phosphate	0.25	gram
Magnesium sulphate	0.25	gram
Iron sulphate	2.25	gram
Manganese sulphate	0.0075	gram
Ammonium sulphate	0.50	gram
Cane sugar	20.0	gram
Powdered agar	15.0	gram
Distilled water	1.0	liter

This nutrient solution is heated and dissolved, poured into the flasks, plugged with cotton stoppers and sterilized. The sterilization takes 15 minutes at 15 pounds pressure in a pressure cooker or autoclave.

Before planting, the seed must also be sterilized in a solution of calcium hypochlorite. To facilitate wetting of the seed coat, the seeds may be dipped momentarily into a 50% alcohol solution and then into the hypochlorite (Chlorox) for 5 minutes. After the seed is drained (it doesn't have to be washed) it should be scattered over the surface of the agar (which has solidified upon cooling) with a wire loop sterilized beforehand with a flame. As soon as the seed is inserted, the cotton plug should again be replaced and this time covered with foil. A lump of seeds carried by the loop will contain from 2,000 to 3,000 seeds, of which over 1,000 will germinate and produce small plants in 4 to 6 weeks.

When the seedlings are 8 to 12 months old, they can be transplanted with a scalpel and cleaned of agar with running water. Then they are transplanted to 2½-inch pots, about 25 to a pot. The pots should be placed in a chamber with a glass lid and misted each day with an atomizer. After 6 to 10 months, they can be transferred to individual 1½-inch pots and grown in the open greenhouse.

## OTHER PROPAGATION METHODS

Any Orchids that have aerial roots may also be propagated by stem cuttings which include some of the roots. The plantlets which form on the old stems of some Orchid species can also be planted when the roots are well developed.

Cattleyas may be increased by division of the mother plant as well. Make a notch in the rhizome (prostrate stem), about 3 pseudobulbs from the tip. Plant the tip with the healthy pseudobulbs attached and lay the old stem in a moist location to await the development of dormant buds. The buds may then be removed and planted.



Dividing Cattleyas. Plant on the left is the front portion of 3 bulbs with leaves. At the right are rear bulbs, which can also be potted.

#### Planting Cattleyas.

- a. Sufficient fir is put in container to support plant and pot clip that is placed on plant.
- b. Fir bark is poured in and packed down firmly with a potting stick.
- c. Leave enough room for pot to hold water.



Back bulbs from plants that have overgrown their pots can be cut into sections of 2 or 3 bulbs each, and placed together in a 6-inch pot. When they have sprouted, they are ready for individual pots.





A collection of *Cypripediums*.

### 3

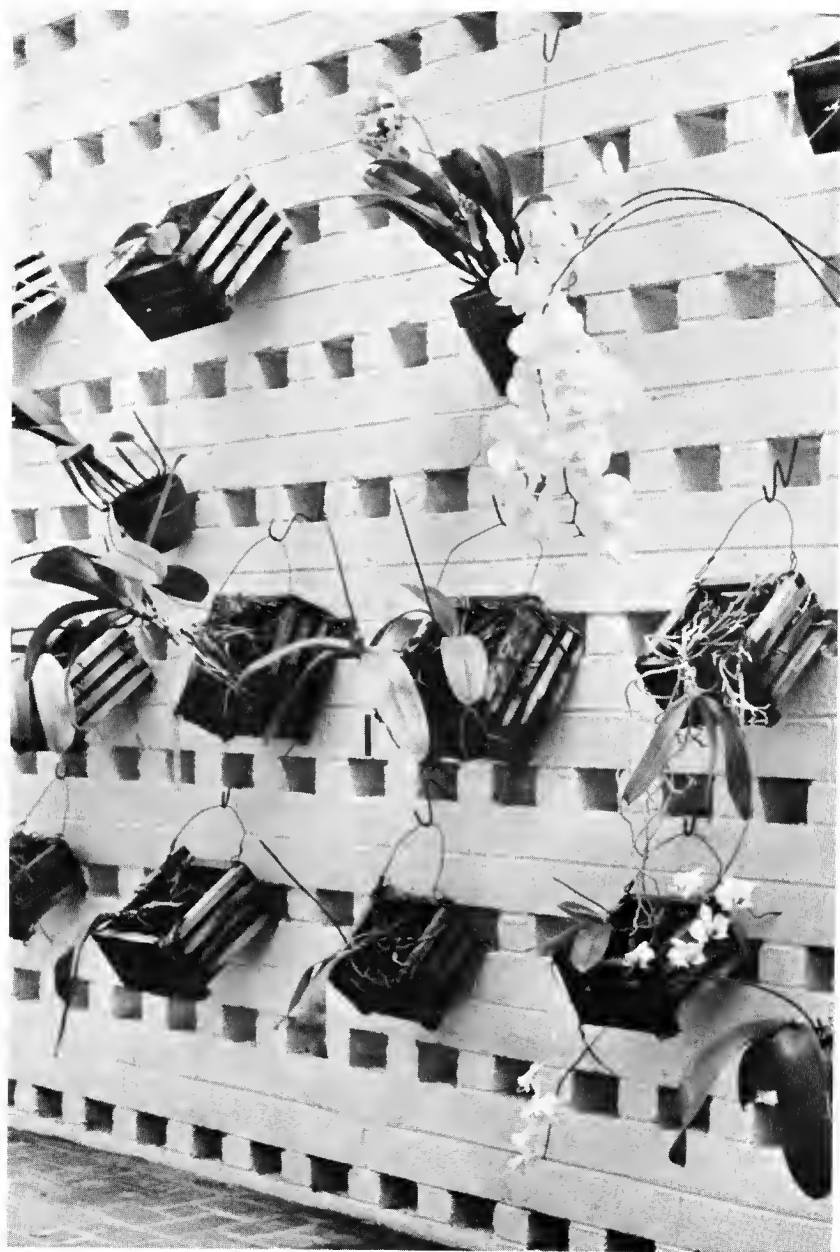
## GENERAL CULTURE OF ORCHIDS

### CONTAINERS

Orchids may be grown in pots and baskets or on rafts (slabs) of osmunda or tree fern fiber. The standard clay pot or the azalea pot, which is  $\frac{2}{3}$  as tall, is the most popular. The size of the pot, which necessarily varies with the Orchid, should be only slightly larger than the roots of the plant. The small Orchids are generally first grown in a  $1\frac{1}{2}$ -inch container, then transferred to a 3-inch one and then shifted to a 4-inch pot. Usually, larger Orchids should be kept in the same pot for 2 years and then repotted in a pot 2 inches larger.

If old pots are used again, they should first be thoroughly scrubbed inside and out with a steel wire brush. Soaking the pots for a day facilitates this process.

Many Orchids are ideal for basket culture and specially constructed Orchid baskets, generally of redwood or plastic, are available in a variety of shapes and sizes. Slabs of tree fern suspended on the wall or from the ceiling serve as sufficient support for many dwarf species. However, these need more constant moisture than plants in baskets or pots, and may require spraying several times daily during hot weather.



Note the graceful arching branches of these *Phalaenopsis* growing in baskets.



## PLANTING MEDIA

Orchids are grown in a variety of coarse-textured media, ranging from volcanic pumice through fernwood fiber to shredded fir bark. A mixture consisting of many sizes of washed porous pumice is the longest lasting and serves to provide air and water to Orchid roots. Sawed pieces of tree fern from Hawaii, known there as "Hapuu," is a coarse and practically indestructible medium, lasting from 3 to 10 years. Recently the fir barks, shredded or chopped pieces of bark derived by a by-product of the lumbering industry, have come into use for Orchid planting. The smaller-sized pieces are successfully used for growing seedling Orchids, the medium-sized pieces for adult Orchids and the largest sizes for the Vandas and other epiphytic Orchids.

## FERTILIZING

It is often stated in literature that Orchids do not need to be fertilized, but this is contrary to the facts. Whatever the media, regular fertilizing is required for best growth. The bark preparations especially need added nitrogen, which is used in their breakdown and unless sufficient nutrients are applied, plants will suffer.

Use any of the commercially formulated Orchid foods or make up a solution of 2 ounces monoammonium phosphate and 3 ounces of potassium nitrate in 3 gallons of water. This latter solution should, in turn, be added to more water, at the rate of 1 ounce of solution to each gallon of water. Nutrients should be applied approximately every 2 weeks for most kinds of Orchids.

## WATERING

Watering of Orchids is divided into 3 categories. *Damping down* is the wetting of the floors and benches to increase the humidity. *Spraying* or *sprinkling* involves the use of a fine spray, which is done only when the temperature is high and the ventilation is good. *Soaking* is the heavy watering plants receive when the growth is active.

Orchids without pseudobulbs, such as the Vandas, *Cypripediums* and *Phalaenopsis*, should be watered as soon as the surface is dry, as they have no capacity for water storage and need water all year. *Cymbidium*, *Dendrobium*, *Oncidium* and *Miltonia* should be watered heavily during their season of growth, whereas *Cattleya*, because of its ability to store water, can withstand some drought.

## VENTILATION

Most Orchids, being semi-epiphytes, have their natural habitat in the tops of trees where they are always exposed to moving air.

Thus, they benefit from good ventilation and should not be confined in a *poorly-ventilated* terrarium for long. Luckily, those Orchids that need high humidity fortunately require less air movement. In any event, however, if the foliage is wet, it is best to place the plant where it will dry off quickly.

## LIGHT

Although Orchids are rarely found in the dark recesses of the jungle where air is dank and stagnant, most species cannot stand strong sunlight without burning the foliage. Therefore, it is usually best to place the plants in filtered sunlight or bright, diffuse light.

## TEMPERATURE

During the early days of Orchid growing, it was the practice to put plants in hot, stuffy greenhouses, which led to the general belief that they are hot-house plants. This is dangerous, in that most Orchids rebel at excessive heat. It is important to determine the temperature classification — warm, intermediate or cool — of your Orchids, as discussed in Chapter I, and be guided accordingly.

# 4

## ORCHIDS AS HOUSE PLANTS

The first question usually asked when an Orchid plant is received is, "Where will I keep it?" Since Orchids are such sturdy plants, they will survive almost anywhere in the home where sufficient light is available. They grow well on window sills, on tables adjacent to sunny windows, in the kitchen, living room, dining room, or even in the bathroom.

Orchids that need an exceptional amount of light, such as Cymbidiums and Vandas, are difficult to grow in the home. Cattleyas, Epidendrons, Oncidiums and some Dendrobiums need all of the light they can get indoors, whereas Phalaenopsis, Cypripediums and Odontoglossums demand somewhat less light.

Day temperatures indoors are well suited to Orchids but many will not flower unless night temperatures are also suitable. Phalaenopsis and the mottle-leaved Cypripediums need warm night temperatures (around 60° to 65°), Cattleyas, Epidendrons and Oncidiums, 55° to 60° night temperature and Miltonias, plain-leaved Cypripediums and Odontoglossum a somewhat cooler (50°) night temperature.

Orchids do not need excessive humidity but do well when the relative humidity hovers between 40 to 60 percent. In most homes



Miniature Cymbidium "Flirtation".



Vanda Orchid blooming indoors.

the humidity in damp weather is adequate, but in Winter and during the hot dry Summer, you will have to provide extra moisture.

## HUMIDIFYING DEVICES

The simplest way to increase humidity is to imbed the pots in a tray of moistened pebbles, of porous pumice, if possible. The increased evaporative surface will serve to greatly increase the efficiency of the tray.

Another easy way is to increase the number of plants of all types. The moist air given off by the plants, especially Ferns, helps greatly to increase the humidity. For best results, keep the plants concentrated in a single area, preferably near a cement or brick floor that can be washed down repeatedly.

One of the most common ways of controlling humidity is to build a terrarium (a glass or plastic case or box) with a sliding or removable top for ventilation. With many small plants that need extra humidity, an old goldfish tank will suffice. However, large Orchids need a bigger and better-ventilated terrarium than most plants.

The Wardian Case, an air-tight, box-like container of glass or plastic, which can be purchased or built to most required sizes, is a veritable miniature greenhouse. Many of the available commercial sizes have elaborate systems for control of heat, cold and humidity.

Remember, Orchids should have *some ventilation at all times*, it being especially important to have good ventilation whenever the sun hits the glass, to prevent excessive heat.

**Cattleyas need the humidity  
provided by moistened  
colored pebbles.**



## **5**

### **INDOOR GREENHOUSE, LATHHOUSE AND OUTDOOR CULTURE**

#### **INDOOR GREENHOUSES**

By far the best way to house a collection of fine Orchids is in a home "greenhouse," not to be confused with the elaborate greenhouse structures used by commercial growers. As a matter of fact, you can buy a simple pre-fabricated structure and put it up yourself, or you can start from scratch and build it. Usually you can save money by buying a pre-cut model, if it suits your needs.

A greenhouse used for growing Orchids must have a good system of ventilation. The ventilators should be large enough to provide a good sweep of air and, at the same time, easy to manipulate. Another essential is the humidifying system provided by an automatic misting system. This can be implemented by providing easy access to walkways and the space under benches so that they can be wet down handily, or by the even better method of growing moist-air-producing Ferns and other foliage plants under the benches.

When selecting a location for your home greenhouse outdoors,

don't place it under a tree if you expect to grow Orchids, since the shade from the trees will too severely limit the light needed by the Orchids. This is a good rule to follow in any event because of the ever-present hazard of falling branches.

## LATH HOUSE

In tropical areas, Orchids can be grown in lath houses, which are less costly to build than greenhouses, and more amenable to the contours of the yard.

To build a lath house, imbed strong posts in cement and nail the laths securely. The size of the structure will depend on the available area rather than other considerations. While ventilation is not a problem, humidity should be regulated by regular watering.

## OUTDOOR

A much-neglected aspect of Orchid culture is the growth of the plants out-of-doors, since there are hundreds of species that are hardy enough to grow anywhere. Many of the tropical kinds which thrive outdoors all year round in Florida and California may be flowered on trees and in raised beds during the *Summer* months in *all parts of the United States*. Even though they must be returned

Vandas in pots decorate a patio.





**Oncidium with hundreds of flowers blooms in a garden.**



**Colorful Epidendron Orchids grow well outdoors in California.**

indoors before frost threatens, they will grow much more vigorously if they have enjoyed the mild outdoor climate.

However, indoor-grown plants are subject to burning if they are suddenly exposed to the full sun, so a bright, shady location under a wide-spreading tree is best. They will also need frequent watering, and benefit from a mist system which turns off and on automatically during the day.

The best way to grow Orchids on trees is to grow them on slabs of tree fern (Hapuu) and hang the slabs, like pictures, in likely locations. Rough-barked trees are best because they hold the moisture longer, but trees that are too dense and cast too deep a shade e.g., all Needle Evergreens) should be avoided.

Some Orchids, of course, will bloom in darker locations than others and these should be selected if your number of bright, shady locations is limited. Epidendrons, Oncidiums and most Cattleyas thrive outdoors on trees. Vandas have the greatest vigor and bloom more profusely out-of-doors, generally in the ground. If your climate is excessively warm, try Phalaenopsis in your bower of flowers.

When growing Orchids in the ground, it is best to provide a raised bed so that excellent drainage may be obtained. Redwood planks 1 foot high can be used for straight sides, but masonry blocks serve best where curved beds are desired. Fill the bed with shredded or chopped fir bark, then either plant the Orchids directly or merely set the Orchid pots in the medium. Plants in pots, of course, will need more frequent watering.



Laeliocattleya.



Close-up of Cymbidium "Great Day".

## 6

### A CATALOGUE OF THE MOST POPULAR ORCHIDS

#### CATTLEYA

To the public, Cattleyas are the best known Orchids and their flowers are the most magnificent of all flowering plants. The Cattleya was introduced into England only a little over 100 years ago and quickly became the most popular commercial flower. This *semi-epiphyte* genus contains about 65 species — all native to the South and Central American jungles, where they grow high in the tops of trees and on rock cliffs.

The greatest progress in hybridization has been made with this Orchid. Hybridists have succeeded in combining the large size and beautiful form of the Cattleya with the frilly lip of another genus, *Brassavola*, bringing into existence a new type named the *Brassocattleyas*. The brilliant colors in the genus *Laelia* were combined in the *Laeliocattleyas* and further crossing has created the *Brassolaeliocattleya*. The latest feat of the hybridists is adding blood of the genus *Sophranitis*, which confers its red color to its offspring. Some of these belong to the *Sophrbrassolaeliocattleyas*, which has been shortened to *Potinaria* (thankfully).

The general requirements for Orchid culture found throughout this book apply to Cattleya. They will generally thrive at light intensity of about 2000 candles and at a 60-80% humidity. The blooming calendar of several of the popular Cattleya species is set forth in Table 1.





Beautiful evergreen foliage and sprays of long-lasting bloom are characteristic of *Cymbidium*.

## CYMBIDIUMS

Cymbidiums for many years have been grown all over the world, but only since World War II have they come to rival Cattleyas in popularity. They have achieved this distinction chiefly because of their vigor and ease of growth, and due to the fact that their culture is better understood. Evergreen foliage gives these Orchids a handsome appearance when out of bloom and, best of all, it is not unusual for a plant to stay in flower for 2 months or more. Further, the attractive blooms last for several weeks when cut and placed in water.

Modern Cymbidiums have been derived from species native to the mountainous regions of India, Burma and Viet Nam. Since the weather there consists of warm, sunshiny days, followed by cool nights, these are the conditions which are best suited to their growth. These combinations of temperatures and sunlight are the most important in the Fall, when the flower buds are initiated.

In parts of Southern California, they may be grown outdoors in the bright shade in the same beds as Camellias and Azaleas, but should be grown indoors in other parts of the country. They will stand a few degrees of frost, but the flowering spikes may be damaged when temperatures go below freezing. Night temperatures indoors must be kept below 50°, but daytime temperatures as high as 80° are not harmful.

Cymbidiums are mostly *semi-terrestrial* Orchids which will grow in a finer planting mix than Cattleyas. However, drainage must be good because they will not tolerate standing in water. Their ever-



Cymbidiums can be grown outdoors with Azaleas and Camellias.

green foliage and great vigor demand heavy and frequent fertilizing. A planter mix containing redwood leaf mold, peat moss, fir bark and sponge rock, laced with charcoal, is the most satisfactory.

During the growing season, Cymbidiums need lots of water — indeed if you have good drainage it is impossible to water them too much. During the Winter, plants thrive on considerably less water. Spray the foliage occasionally when watering on warm, sunshiny days.

Repot Cymbidiums in the Spring after the plant has flowered, if it has filled the container. (Usually this does not have to be done more often than once in 3 or 4 years.) When repotting, hold the plant firmly in position and add the planter mix, making sure that it is packed solidly around the roots. Jarring the pot helps settle the planter mix and watering will complete the settling.

Lack of sufficient light is the main reason why Cymbidiums do not flower. If you have a light meter, 2000 to 4000 foot-candles is the optimum amount needed. Once spikes appear, heavy shading is required. One way to make use of this quirk is to bring your plants outdoors as soon as all danger of frost is past and leave them out until flower spikes appear in the Fall. Then they can be brought indoors for blooming.

## CYPRIPEDIUMS

There are 2 distinct botanical groups of Cypripediums, although both are commonly known as Cypripediums, or "Cyps." The group with spotted leaves, which thrives when night temperatures are kept above 65°, actually belongs to the genus *Paphiopedilum* and is native to tropical Southeast Asia. The second group (the true Cypripe-



A spray of "Hawaii" Cymbidiums.

diums) has solid green leaves, is native to the Temperate Zone and does best when night temperatures are around 55°. Both groups withstand maximum day temperatures in the 70's. For the amateur grower it is best to choose between these two types, picking the "warm" type to grow along with Cattleyas and Phalaenopsis or selecting the "cool" type to raise with Cymbidiums. In either case, greater satisfaction will be derived if the grower selects only hybrids for his collection.

Both groups are *semi-terrestrial* Orchids and thrive in a planting medium like that of Cymbidium. Light requirement of Cyps is quite low—only about 600 to 700 foot-candles, except in Winter when somewhat brighter light (800 to 1000) is needed. All need plenty of water and should have sharp drainage. They have no pseudobulbs and should be kept continuously moist *but never wet*, with the humidity kept around 75%.

A close-up of Cypripedium  
"Bagshot".





Phalaenopsis grows best in a warm house along with other tropical plants.



Phalaenopsis.

Before flower buds open, the stems of Cyps are soft and pliable. Therefore, the flowers should be supported from an early stage with a wire stake. Some varieties make 2 buds, and 1 of these should be removed early to allow the other to develop size and quality. As with other Orchids, good ventilation and air movement is necessary. Cyps do very well without any fertilizer, but, if you wish, they can be fed with plant food tablets every 2 weeks.

## PHALAENOPSIS

Phalaenopsis, or Moth Orchids, are native to the Philippines and the islands of the Far East tropics. Hybrids are far superior to the pure species and the beauty of their white or pink blooms, produced on long, arching stems, is well known. In particular, the long-lasting blooms are prized for brides' bouquets.

Since the advent of modern heating, this *semi-epiphyte* has increased greatly in popularity. Phalaenopsis revel in the highest temperatures of all Orchids, thriving on a night temperature of 70°, with a steaming 80° during the day. In addition, at least 75 to 90% humidity is needed. Because of these fairly difficult temperature-humidity requirements, Phalaenopsis are raised almost exclusively in greenhouses.

During the Summer, when day length is greater, light intensity should be kept below 1000 foot-candles. In Winter, plants will benefit from 1500 foot-candles, but for shorter intervals. The need for ventilation is less with Phalaenopsis than with any other Orchid.

Water, collecting and standing on the leaves, or in the leaf axils, is harmful, but frequent watering is necessary since, like the Cyps, Phalaenopsis have no water storage organs. They should not be permitted to become dry and should be watered before noon, if possible. For best results, feed with plant food tablets every 2 weeks.



Varieties of *Odontoglossum*.



*Odontoglossum crispum* hybrid.

## ODONTOGLOSSUMS

*Odontoglossums* are divided into 2 distinct groups — one from Mexico and the other from Colombia. The Mexican group is more heat-tolerant than the Colombian, which comes from high in the Andes Mountains.

However, the Mexican species prefer cool conditions and should be grown along with *Cypripediums* in the shadier portions of the greenhouse. When temperatures rise above 80° they suffer, but they can stand temperatures as low as 45° at night. The Colombian types prefer an even day and night temperature with no more than 15° differential. Therefore, during the warm Summer weather, do not let the indoor temperature get below 65° at night, or else the Colombians will suffer.

Humidity should be maintained at 70 to 80% for best growth, with the planter mix kept constantly moist. *Odontoglossums* have no rest period and therefore should be watered frequently and fertilized every 2 weeks. Ventilation is important, as it is with all Orchids, but do not allow cold drafts to blow directly on these plants.

*Odontoglossum grande*, a Fall bloomer, is a good one with which to start your collection. Listed in Table 2 are the blooming months of many other popular species of this *semi-epiphyte* Orchid group.

## ONCIDIUMS

The genus *Oncidium* contains 750 species that grow from Mexico to Argentina. Mostly *epiphytic*, the cultural requirements are much the same as *Cattleyas*. They need high humidity and plenty of water, but with excellent drainage. They also need full sunlight and frequent applications of fertilizer. A 2 or 3-week rest period is required, however, when new growth is completed, before new flowers are formed.



A collection of *Oncidiums* blooms on a concrete block wall.

## MILTONIAS

Miltonias, on the other hand, have no rest period and may bloom twice a year. Each plant makes up a bulb that blooms and immediately starts a new lead (shoot), which will flower as soon as it matures. In fact, there may be 2 leads thrown from each bulb so that, in a short time, a plant that has flowers most of the year will be developed.

Like Cattleyas, Miltonias are *semi-epiphytic* and need very coarse medium, such as chopped osmunda fiber or chopped fir bark. They will grow with Cattleyas at temperatures close to 60° but, due to their wide tolerance, temperatures as high as 90° and as low as 55° are not harmful. However, they do differ from Cattleyas in their need for shade—only 500 foot-candles being required.

The flowers of *Miltonia* are long-lasting on the plant—often remaining in good condition for 6 weeks. The bright colors produced in white, yellow, pink, red and deep purple, are responsible for its name “the Pansy Orchid.” Crosses between *Odontoglossums* and *Miltonias*, called *Odontonias*, have produced extremely colorful plants.

## PESTS AND DISEASES

### PESTS

Many insects and other pests attack Orchids, but the most important are aphids, thrips, mites, scale insects, weevils, maggots, slugs and snails. Ants are harmful indirectly, and should be controlled with chlordane, because they carry aphids, scale and mealybugs around, thereby infesting healthy plants. Good sanitary procedures, starting with pest-free plants, are the basic control measures, but in case of a severe infestation, modern sprays make controlling these pests fairly easy.

### APHIDS

Aphids attacking Orchids include the lantana aphid, which also attacks Ferns and Palms. This insect, black-colored in its winged stage, is often mistaken for a whitefly in its wingless form. The green peach aphid, which also attacks many ornamentals and is often a carrier of virus diseases, is sometimes troublesome. In addition, the lily aphid occasionally is found infesting Orchids. All are controlled with sprays of nicotine sulphate. Extra light dilutions are advocated to prevent injury to Orchids, a teaspoon per gallon of water being sufficient.

### SCALE

Scales attacking Orchids include proteus, latania, oleander, purple, tea, hemispherical, Florida red, false parlatoria, cymbidium, cottony Orchid, Boisduval, soft and Mackie scales. Along with mealybug, which is really a soft scale, they constitute an important group of pests.

Armored scales have a protective covering or shell in their adult stage. It is the female which, as is so often the case, is the deadlier of the species. After a brief crawling stage, the armored scales insert their sucking mouthparts into the plant. They then lose their legs and antennae and remain stationary for the rest of their lives, laying eggs or giving birth to their live young. Soft scales, which have a chitinous covering, retain their under-developed legs, however. Thus, they can move about, but so slowly that they appear to be fixed in place.

Scales are controlled with a spray of malathion. Light oil is also effective and can be used on plants that are not damaged by oils. Wettable DDT kills the crawling stage of Boisduval, cymbidium and



Mackie scales, whereas methyl bromide and cyanide are effective fumigants in cases of severe infestations. Cyanide should be used with caution, since it can be dangerous to both the operator and to the Orchids. *Low humidity is essential to the safe use of cyanide.*

## MITES

Two kinds of mites infest Orchids: red spider (the 2-spotted mite) which attacks Cymbidiums, and the false spider mite, whose species attacks the upper surfaces of Phalaenopsis leaves. Mites damage plants by rasping the leaves, causing them to turn a sickly gray. Mealy cobwebs on the lower side of the leaf are characteristic of the spider mite. Aramite and kelthane are 2 materials which give excellent control.

## MAGGOTS

The orchid fly is a small black insect that lays eggs in the new growth of Cattleyas. The hatched maggots feed in the tissues, causing them to swell, and the infested plants never bloom. DDT is the most effective control.

## THRIPS

Thrips are very small, slender insects, just visible to the naked eye. They feed on plants by rasping the cells, causing a gray discoloration. At least 3 kinds of thrips attack Orchids and all may be controlled by spraying with 1/3 ounce of wettable DDT per gallon of water.

## WEEVILS

The Cattleya weevil is a small black insect with white markings on the back. It punctures the plant and lays eggs, which hatch and feed within the plant. This allows the entrance of decay organisms, which cause rot. One of the other weevils sometimes attacking Orchids, the black vine weevil, feeds on the flower buds. Luckily, weevils, which once did considerable damage to commercial Orchids, have been brought under control with DDT.

## OTHER PESTS

Slugs and snails may attack Orchids, feeding on the flowers and leaves, but they are easily controlled with metaldehyde baits or hand picking. Sowbugs are sometimes troublesome on tender petals or buds, but can be controlled by careful use of poison baits.

## VIRUS DISEASES

Several virus diseases of Orchids have been described. Their common symptoms include mottle, breaking (lower or flower mottling), chlorosis, spots, streaks and rings on the leaves and flowers. The affected plants may become contorted and misshapen, stunted and sometimes killed outright.

Viruses are mostly spread by insects and, once a plant is infested, the virus pervades all parts of the organism. However, although new plants obtained from back bulbs or divisions of infested plants will carry the virus, seedlings of such plants will be free of virus diseases. Control consists chiefly of the exclusion of infested plants. Such plants should be destroyed, or if too valuable, should be isolated from other healthy plants.

## BACTERIAL DISEASES

An early symptom of bacterial disease is a water-soaked spot on the leaves or bulbous stems, which enlarges gradually as the tissues die. This brown spotting will often prove fatal to the *Phalaenopsis* Orchids, whereas the same disease merely causes spots on the old leaves of *Cattleyas*. In addition, soft rots often develop on the bulbous Orchid stems.

Since bacteria are spread by splashing water and are favored by high humidity, the spread of the bacteria can be prevented by avoiding overhead watering, and by providing good aeration to promote rapid drying. Bacterial leaf scorch of *Miltonia* spreads rapidly when high humidity prevails, and the plant is killed by the rotting of the rhizome. To prevent this happening, cut out the infected area and dip the entire plant in natriphene.

## FUNGUS DISEASES

*Pythium* black rot attacks seedlings and mature *Cattleyas*. This fungus is favored by high humidity, overwatering and high temperature, growing only in the presence of water. Wounds produced when the plant is divided, or when flowers are cut, are excellent avenues of entrance for the pathogen. Infected plants wilt and sometimes die quite suddenly. Control is effected by drenching the plants with natriphene.

## SMOG

Industrial gases often cause serious damage to Orchid flowers. Dry sepal disease of *Cattleyas* is caused by excessive ethylene gas and, sometimes, Orchid leaves are damaged by high concentrations of poisonous gases. The only practical control is to use air filter systems that absorb the toxic materials.



White Cattleya: Mount Shasta.

TABLE 1  
BLOOMING CALENDAR — CATTLEYA SPECIES

SPECIES	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Percivaliana	X											
Trianae	X	X										
Mossiae				X	X							
Schroederae				X	X							
Skinneri					X	X						
Warneri					X	X	X					
Mendelii					X	X	X					
Citrina					X	X	X	X				
Luedemanniana (speciosissima)						X	X	X				
Gaskelliana							X	X				
Gigas (Warszewiczii)						X	X	X				
Schilleriana							X	X				
Harrisoniae							X	X	X			
Bicolor								X	X			
Hardyana								X	X			
Dowiana								X	X	X		
Labiata										X	X	
Bowringiana											X	X

TABLE 2

## BLOOMING CALENDAR — ODONTOGLOSSUM SPECIES

SPECIES	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rossii	X	X	X									
Cervantesii				X	X	X						
Crispum				X	X	X						
Harryanum				X	X	X						
Nobile				X	X	X						
Pulchellum				X	X	X						
Citrosmum				X	X	X						
Insleayi							X	X	X			
Schlieperianum							X	X	X			
Bictoniense										X	X	X
Grande										X	X	X

TABLE 3

SOME COOL TEMPERATURE ORCHIDS  
FOR BEGINNERS  
(50°F Minimum)

SPECIES	<i>Size of Flowers in inches</i>	<i>Predominating Color</i>
Cymbidium	mostly 2-4	Various
Cypripedium insigne	4-5	Greenish white
Cypripedium spicerianum	3	White
Cypripedium villosum	5-6	Greenish
Dendrobium infundibulum	4	White
Epidendron cochleatum	2-3	Yellowish green
Odontoglossum bictoniense	1½	Yellowish green
Odontoglossum citrosmum	2-3	White
Odontoglossum grande	5-7	Yellow
Oncidium cavendishianum	1-2	Yellow
Oncidium crispum	1-2	Greenish brown
Oncidium leuchochilum	2	Yellowish green
Oncidium tigrinum	3	Yellow

# SOME INTERMEDIATE TEMPERATURE ORCHIDS FOR BEGINNERS

(55°F Minimum)

SPECIES	Size of Flowers in inches	Predominating Colors
<i>Cattleya amethystoglossa</i>	4	Rose purple
<i>C. bicolor</i>	4	Bronze green
<i>C. bowringiana</i>	2-3	Rose purple
<i>C. dowiana</i>	6-8	Nankeen yellow
<i>C. gaskelliana</i>	5	Rose purple
<i>C. labiata</i>	6-8	Bright rose
<i>C. loddigesi</i>	6	Lilac rose
<i>C. mendeli</i>	6-8	Rose white
<i>C. mossiae</i>	5-8	Light rose
<i>C. percivaliana</i>	5-7	Deep rose
<i>C. schroederiana</i>	6-7	Light rose
<i>C. skinneri</i>	2-3	Rose purple
<i>C. trianae</i>	6-7	Light rose
<i>C. warneri</i>	6-8	Deep rose
<i>Dendrobium moschatum</i>	3-4	Yellowish rose
<i>Oncidium altissimum</i>	1½	Yellow
<i>Oncidium sphacelatum</i>	1	Yellow

TABLE 5

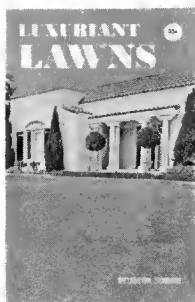
# SOME WARM TEMPERATURE ORCHIDS FOR BEGINNERS

(65°F Minimum)

SPECIES	Size of Flowers in inches	Predominating Color
<i>Cypripedium bellatulum</i>	3	Creamy white
<i>C. concolor</i>	3-4	Light yellow
<i>C. lawrenceanum</i>	4-5	Whitish green
<i>C. niveum</i>	3-4	Satiny white
<i>Oncidium luridum</i>	1-2	Yellowish green
<i>O. papilio</i>	3-4	Reddish crimson
<i>Phalaenopsis amabilis</i>	5	White
<i>P. aphrodite</i>	4	White
<i>P. schilleriana</i>	3-4	Light rose
<i>P. stuartiana</i>	1½-3	White
<i>Vanda coerulea</i>	3-4	Light blue
		variable
<i>V. sanderiana</i>	5	Yellow & rose
<i>V. sauvis</i>	2-3	White
<i>V. tricolor</i>	2-3	Whitish yellow

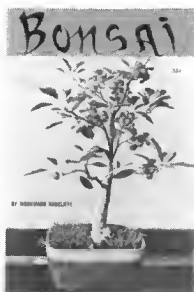


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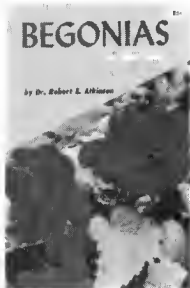
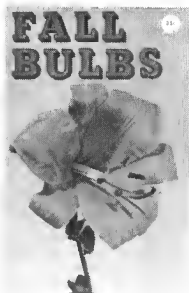


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## SUCCULENTS

...in the GARDEN



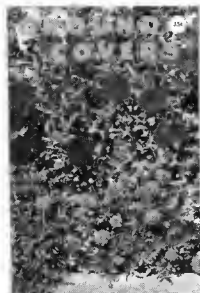
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